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EXAMINER	
PARKER, KENNETH	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/051,709	Applicant(s) SUGIURA ET AL.	
	Examiner Kenneth A Parker	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 April 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-8,10,30,32-34,36-38 and 40-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *38, 40-42* is/are allowed.

6)☒ Claim(s) *1,2,5-8,10,11,30,32-34,36 and 37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 7, 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

What constitutes a "separation line" is unclear. For examining purposes, it is presumed that any separation in the layer can be considered a separation line. It is still not clear- does this mean the separation such as shown by the Tsuda references, or does it mean the wrinkles disclosed in the specification associated with the deformation of shrinkage characteristics?

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 5-8, 10, 30, 32-34, 36-37 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsuda 6262783.

Tsuda discloses a resin with different layers which deform differently under heat. As this method is one applicant lists in the specification as including the formation of deformation characteristics, deformation characteristics must occur. Additionally, the presence of undeformable structures under portions (structures 205) causes distributed deformation characteristics. Undulations are formed (see cover figure and others). The reflective layer is deposited on the undulations. The undulation patterns are randomly located (see figures). Subsequent heat treating is carried out.

"Next, as shown in FIG. 4D, the resultant substrate is heat-treated at a temperature of about 120 to about 250.degree. C. After upper corners of the
remaining portions of the resist 420 are rounded off, the remaining resist 420
is cured by heat treatment at about 200.degree. C. for about 30 minutes."

Therefore, claims are anticipated by the reference.

(re claim 8) a method of manufacturing a reflection type liquid crystal display device, comprising steps of (a) forming a photo-sensitive resin layer having a predetermined film thickness on a substrate having a transistor formed on the surface thereof; (b) forming a contact hole to an electrode of said transistor by a photo-

lithography process for partially exposing and developing said photo-sensitive resin layer, (see figures 12a 1-12f) (c) post baking to heat said photo-sensitive resin layer to a first temperature; (d) irradiating light having exposure energy on the surface of

said photo- sensitive resin layer, to form distribution of thermal deformation characteristics in a thickness direction or a plane direction of the photo-sensitive resin layer; and then (e) final baking to peform heat treatment at a second temperature higher than said first temperature, to form undulation at the surface of said photo-sensitive resin layer (see above); (re claim 10) the method of forming a reflection type liquid crystal display device according to Claim 8, further comprising a step of exposing or half-exposing and developing said photo-sensitive resin layer with a predetermined pattern, to form separation lines for separating said photo-sensitive resin layer before said step (c). (see above). Please not that the spaces between the bumps are construed as "separation lines" (see discussion above); (re claim 11) the method of forming a reflection type liquid crystal display device according to Claim 8, wherein the average inclination angles of said undulation is set to 00 - 150 by controlling the film thickness of the photo-sensitive resin layer in said step (a). time and temperature of post-bake in said step (c), and irradiation energy quantity in said step (d) (see above); (re claim 5) wherehe method of forming a reflection type liquid crystal display device according to Claim 2, wherein the light having said exposure energy in said process (a) is irradiated on the entire surface of the photo-sensitive resin layer to alter the surface, so as to form the distribution of the thermal deformation characteristics in the thickness direction of the photo-sensitive resin layer. (see figures 12a 1-12f). Therefore claims 1-2, 5-6, 30, 32-34, and 36-37 are anticipated by the reference.

Claims 1-2, 6-7, 30, 32-34, 36-37 are rejected under 35 U.S.C. 102(e) as being anticipated by Tsuda 6600535.

Tsuda discloses a resin with different bumps of different materials and size which each melt to a different shape as they start with a different shape. As this method is one applicant lists in the specification as including the formation of deformation characteristics, deformation characteristics must occur. Undulations are formed (see cover figure and others). The reflective layer is deposited on the undulations. Therefore, these claims are anticipated by the reference. The second layer provided and illuminated between figures 1e, 1f, and 1g, ends up with different deformation characteristics as shown in figure H, only the later deposited layer has a shape change between figures 1H and 1G. Heat treatment is listed

"7) After the following heat treatment process at about 120 to 250.degree.
C., the protrusions 12b on the substrate 11 are rounded off, thereby obtaining
convex portions 12c, as shown in FIG. 1D, having a smooth surface without any
sharp edges thereon. In the present example, the heat treatment is performed
at about 180.degree. C. for about 30 minutes. Hereinafter, this step is
referred to as the "heat-treatment process".

(8) Then, the series of steps as shown in FIGS. 1A to 1D including the
photolithography process and the heat-treatment process is repeated for a
plurality of rounds (two more rounds in the present example, as shown in FIGS.
1E to 1H and 1I to 1L)."

As arbitrary shapes (meaning any shape, as opposed to random shapes) are within the scope of the claim, the disclosed shapes meet the claim langauge. Partial

processing is performed, as the layer is partially exposed to light (the part not yet rounded). The reference therefore shows (re claim 1) a method of manufacturing a reflection type liquid crystal display device, comprising steps of: (a) forming a distribution of deformation characteristics in a thickness direction or a plane direction of a resin layer; and (b) forming undulation at the surface of the photo-sensitive resin layer (see discussion above); (re claim 2) a method of manufacturing a reflection type liquid crystal display device, comprising steps of (a) irradiating light having exposure energy on a surface of a photo- sensitive resin layer having a predetermined film thickness, to form a distribution of thermal deformation characteristics in a thickness direction or a plane direction of the photo-sensitive resin layer, and (b) performing heat teatment thereafter to form undulation at the surface of the photo-sensitive resin layer (see discussion above); (re claim 6) the method of forming a reflection type liquid crystal display device according to Claim 2, wherein the light having said exposure energy in said process (a) is irradiated on a part of the area of the surface of the photo-sensitive resin layer to alter the surface, so as to form the distribution of the thermal deformation characteristics in the plane direction of the photo-sensitive resin layer. (see discussion above); (re claim 30) a method of manufacturing a reflection type liquid crystal display device where a reflection layer is formed on a substrate via a resin layer, comprising steps of: distributing thermal deformation characteristics at least in one direction of a thickness direction and a plane direction of said resin layer; performing heat treatment to said resin layer to form undulation at a surface of said resin layer; and forming said reflection layer with a surface shape reflecting said

undulation of said resin layer on said resin layer, wherein the distribution of thermal deformation characteristics of said resin layer is adjusted and said undulation shape of said resin layer is controlled to be a desired shape (see discussion above); (re claim 32) a method of manufacturing a reflection type liquid crystal display device according to Claim 30 , wherein the exposure time is adjusted to expose said resin layer using an arbitrary mask pattern when the distribution of the thermal deformation characteristics of said resin layer is adjusted, so that the film thickness of said resin layer is distributed and said undulation shape of said resin layer is controlled. (see discussion above); (re claim 33) the method of manufacturing a reflection type liquid crystal display device according to claim 30 or claim 27 wherein when at least one type of composing elements to be disposed on the surface of said substrate is formed, the distribution of thermal deformation characteristics of said resin layer is adjusted and said undulation shape of said resin layer is controlled using said composing elements by setting at least one of number, shape and arrangement of said composing elements to a desired value. (see discussion above); (re claim 34) a method of manufacturing a reflection type liquid crystal display device comprising a reflection layer formed on a substrate via a resin layer, comprising: a first step of distributing thermal deformation characteristics in at least one direction of a thickness direction and a plane direction of said resin layer; a second step of forming undulation at a surface of said resin layer by performing heat treatment to said resin layer, and a third step of forming said reflection layer, having a surface shape reflecting said undulation of said resin layer, on said resin layer, wherein said undulation shapes of said resin layer in said third step are

controlled by creating a part which thermal deformation characteristics are different from said resin in said resin layer. (see discussion above); (re claim 36) the method of manufacturing a reflection type liquid crystal display device according to claim 34, wherein said part is formed by forming a resin layer having a predetermined shape with different thermal deformation characteristics in said resin layer (see discussion above); (re claim 37) the method of manufacturing a reflection type liquid crystal display device according to claim 34 wherein said part having different thermal deformation characteristics is formed by performing partial processing on said resin layer (see discussion above). Therefore, claims 1-2, 6, 30, 32-34, and 36-37 are anticipated by the reference.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda 6262783 in view of Fujioka et al 6525792.

Lacking from the disclosure is the claimed distribution of angles (that it comes from the claimed properties is inherent, as the angle is dependent upon those factors as well as others). Fujioka et al both indicate that limiting the average angle to between 0 and 15 degrees gives the best viewing properties. See and Fijioka et al:

"(13) According to the present invention, in view of improving the reflection characteristic of a diffusing reflector, the inclination angle of the layer having uneven surface is optimized. Namely, the reflection characteristic of the diffusing reflector can be improved by controlling the maximum inclination angle to 12.degree. or under. In general, when the maximum inclination angle becomes larger, angular distribution of reflected light beam is widened. When the maximum inclination angle is under 12.degree. and particularly located near 10.degree., the diagonally incident external light increases in the element to be reflected to an observer located at the front side of apparatus. Therefore, it has been proved that bright image can be obtained. When the maximum inclination angle becomes larger than 12.degree., the element of reflected light totally reflected in the panel increases. Therefore such maximum inclination angle is not preferable."

Therefore it would have been obvious to one of ordinary skill, in the device of Tsuda et al '783, to limit the distribution angle to between 0 and 15 degrees for the benefit of better viewing properties.

Allowable Subject Matter

Claims 38, 40-42 are allowed.

Response to Arguments

Applicant's arguments filed have been fully considered but they are not persuasive.

Regarding claim 1, applicants argument that it incorporates features of allowed claim 38, is surprising, since the feature regarding shrinkage that differentiated 38 from the non allowed claims is wholly missing. Claim 1 only has the distribution of thermal deformation characteristics- which applicant's apply in there specification not only to the

techniques such as that of allowed claim 38, but to the embodiments which appear to be identical to Tsuda. Applicant embodiments of figure 28, 24, 41, 43, 57, 64, 66-67 are the same as the that of Tsuda, in that they put down a resin, pattern and bake it to give rounded corners, then put down another layer and back it to create a rounded surface. Since applicant has used that description on the same technique, than it must apply to the Tsuda reference as well.

Applicant argues:

"The Tsuda et al. reference, in Fig. 4A, discloses irradiating exposure energy to a resist 420 from the back surface of a plate 201 using common electrodes 205 as a mask, thereby leaving the resist 420 only in the portions protected by the common electrodes 205. The remaining resist 420 is then rounded by heat treatment. Thus, the Tsuda et al. reference does not employ thermal deformation characteristics distribution of resist in forming undulations on the resist."

As explained above, the only problem is that several of applicants own embodiments seem to be identical to several of those of the Tsuda references- and applicant describes these as employing "thermal deformation distributation characteristics". See figure 57 and the associated description in the instant specification. Although applicant's specification describes embodiments in the beginning that are clearly different then Tsuda, in the end of the specification applicant describes several embodiments which appear to be the same techniques as described by Tsuda and many others where a resist is patterned, deformed, and a separate resist is deposited on it and then heat deformed, and gives these the same description as employing a distribution of thermal deformation characteristics. Since applicant has in fact described the techniques of Tsuda as employing these characteristics, then clearly

Tsuda in fact does also. So, the layer of Tsuda, with the heated and deformed bumps, and another photosensitive layer layed above it and then thermally deformed, has a distribution of thermal deformation characteristics (the pre-thermally effected layer as compared with the previously un-thermally deformed layer), as indicated in applicant's own specification.

Conclusion

The new rejection to claim 7 was necessitated by amendment. **THEREFORE, THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth A Parker whose telephone number is 703-305-6202. The examiner can normally be reached on 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 305-3492. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.

Kenneth A Parker
Primary Examiner
Art Unit 2871